

Name(s) of Risk Team Members: H. Gassner, C. Zarcone, R. Karol				Point Value → Parameter ↓		1		2		3		4		5		
Job Title: LOTO of STAR magnet power supplies in Building 1006  Job Number or Job Identifier: JRA 13-05B				Frequency (B)		≤once/year		≤once/month		≤once/week		≤once/shift		>once/shift		
Job Description: LOTO powers supplies for STAR IR entry and work in power supply cabinets				Severity (C)		First Aid Only		Medical Treatment		Lost Time		Partial Disability		Death or Permanent Disability		
Training and Procedures List (optional): C-A-OPM 11.4.3.a, STAR Power Supply SHUT-DOWN Check Off List				Likelihood (D)		Extremely Unlikely		Unlikely		Possible		Probable		Multiple		
Approved by: <i>E. Lessard</i> Date: 4-28-05      Rev. #: 1																
Stressors (if applicable, please list all): Noise				Reason for Revision (if applicable): See Note Section Below						Comments:						
				Before Additional Controls									After Additional Controls			
Job Step / Task	Hazard	Control(s)	Stressors Y/N	# of People A	Frequency B	Severity C	Likelihood D	Risk* AxBxCxD	Control(s) Added to Reduce Risk	Stressors Y/N	# of People A	Frequency B	Severity C	Likelihood D	Risk* AxBxCxD	% Risk Reduction
STAR Engineer ramps down power to the STAR magnets and places them in standby in the STAR Control Room at CRT	None	None	N	1	2	1	1	2								
CAS enters first floor pump room and turns off STAR water supply pump	Noise	Hearing protection, training	N	1	2	1	1	2								
Enter 2 <sup>nd</sup> floor pump room/power supply room	Noise	Hearing protection, training	Y	2	2	1	2	8	Although hearing protection is adequate protection, F&ES is investigating ways to reduce pumping noise at power supply area so CAS can better communicate locally and by radio	N	2	2	1	1	4	50%
Verify the power supplies have voltage on voltmeters or red ON lights lit. This will allow easy way to verify supply is off.	None	None	Y	2	2	1	1	4								

Place the 5 power supplies from Remote to Local control by changing switch positions on panels and turn off power supplies by using switch or pushbutton to “off”	None	None	Y	2	2	1	1	4								
Open breaker and unlock main magnet 13.8kV power supply panel door padlock and open door	Shock	70E PPE, training, safety watch	Y	2	2	5	1	20								
Unlock main magnet 13.8kV power supply panel door padlock and open door	Arc flash	70E PPE, training, safety watch	Y	2	2	5	1	20								
Hook up 13.8 kV breaker racking motor shaft and close breaker door	Pinch hand	Training and experience	Y	2	2	1	1	4								
Connect 13.8 kV racking motor to power (plug) and remote operating box	Shock	Use of safe electrical equipment, connectors and plugs	Y	2	2	2	1	8								
Remotely rack out 13.8kV breaker to TEST position	Arc blast	Breaker door closed, remote operation, protection provided by nearby massive power supply cabinets	Y	2	2	3	1	12	Should consider locating CAS to the side of the 13.8kV breaker when remotely racking out breaker such as between main magnet PS and PTT West PS to be completely out of the acc blast direction, should one occur.	Y	2	2	2	1	6	50%
Remove 13.8 kV breaker Kirk Key	None	None	Y	2	2	1	1	4								
Disconnect racking motor power and remote operating box and return to cabinet.	Shock	Use of safe electrical equipment, connectors and plugs	Y	2	2	2	1	8								
Open 13.8kV breaker door and remove racking motor shaft	Pinch hand	Training and experience	Y	2	2	1	1	4								
Open 13.8kV breaker door and remove racking motor shaft	Shock	70E PPE, breaker racked out	Y	2	2	1	1	4								

Open 13.8kV breaker door and remove racking motor shaft	Arc blast	70E PPE, breaker racked out	Y	2	2	1	1	4								
Close 13.8kV breaker door and place padlock back on handle	Pinch hand	Training and experience	Y	2	2	1	1	4								
Open four magnet power supply fused disconnects, remove Kirk Keys (PTT-east and west, Space Trim east and west)	Shock	Training, 70E PPE	Y	2	2	2	1	8								
Open four magnet power supply fused disconnects, remove kirk keys (PTT-east and west, Space Trim east and west)	Arc Blast	Training, 70E PPE	Y	2	2	2	1	8								
Verify the five power supplies are off by observing 0 volts on panel meters or ON lights off.	None	None	Y	2	2	1	1	4								
Place 5 Kirk Keys in Key Tree and remove “capture” Kirk Key	None	None	N	1	2	1	1	2								
Place “capture” Kirk Key in Lock Box and LOTO	None	None	N	1	2	1	1	2								
Further Description of Controls Added to Reduce Risk: (3-7-05) Should investigate way to attach 13.8 kV racking motor shaft more efficiently. (4-25-05) A design has been completed to attach 13.8 kV racking motor shaft more efficiently. The new method does not require the breaker panel door to be open while racking breakers in or out. This significantly reduces the arc blast hazards to the CAS workers.																
*Risk:	0 to 20	21 to 40	41-60			61 to 80			81 or greater							
	Negligible	Acceptable	Moderate			Substantial			Intolerable							